

given by the storm signal detained many vessels in this harbor, the signal having been displayed twelve hours in advance of the storm; the highest velocities of the wind recorded were forty-seven miles, south, at 11.54 p. m. on the 23d, and forty-four miles, south, at 1.30 a. m. on the 24th.

On the summit of Mount Washington, New Hampshire, the most violent hurricane that has occurred since last winter prevailed on the 23d. The wind blew with great violence from the south all day, reaching a velocity of 128 miles per hour during the night; the hurricane abated during the early morning of the 24th.

X.—This disturbance was first observed in the upper Missouri valley at the afternoon report of the 24th. The succeeding report showed a slight depression in southeastern Dakota, and during the following eight hours, a slight depression passed over the upper lake region, attended by light snow north of the Ohio valley. This storm was not severe in any section of the United States, although general snow fell in the northern districts, and numerous high winds were reported from the lake region, the velocity at Buffalo reaching forty miles per hour. This storm apparently passed northward, beyond the limits of stations, on the 26th.

XI.—The morning reports of the 27th indicated the speedy development of a storm in the western part of the Gulf of Mexico, and the succeeding reports of that date showed the northeasterly movement of the storm, the centre at midnight being near New Orleans, and the cold wave which was approaching from the northwest had reached Indianola, Texas, causing a "norther" in that region. This storm extended rapidly to the northeast over the Southern, middle Atlantic, and New England states, causing heavy rains and high winds on the coast. It followed the general direction of the coast line after passing over the south Atlantic states, the depression being much elongated in the direction of the movement. The barometer fell rapidly as the storm passed to the northeastward and when last observed, on the afternoon of the 29th, it had fallen to 29.06 at Anticosti, which, at that time was near the centre of disturbance.

NORTH ATLANTIC STORMS DURING NOVEMBER, 1884.

[Pressure expressed in inches and in millimetres; wind-force by scale of 0-10.]

The paths of the depressions that have appeared in the north Atlantic ocean during the month, are determined, approximately, from reports of observations furnished by captains and agents of ocean steamships and sailing vessels; from data obtained through the co-operation of the "New York Herald Weather Service," and from other miscellaneous data received at this office up to December 23d, 1884.

The observations used are, in general, simultaneous, having been taken each day at 7 a. m. Washington, or 12 hrs. 8 m. p. m. Greenwich mean time.

Nine depressions are shown on the chart for November, 1884; of these, four, viz: numbers 2, 3, 8, and 9, are continuations of storms which first passed over the United States and Canada, and are partly described, under "areas of low barometer," in this REVIEW. One depression appeared in the region between N. 30° and 35°, and W. 70° and 75°, and passed northeastward, causing heavy rains and gales on the coast of the Carolinas. The remaining depressions developed over the Banks of Newfoundland, or in mid-ocean. Only one storm, number 1, appears to have reached the British Isles from the Atlantic; the others either filled in, or passed far to the northward of those islands.

During the first and second decades of November, 1884, the weather over the north Atlantic north of 40° N. was marked by a succession of moderate to strong gales from s. to nw.; with rain or sleet and high seas; during the last decade, strong breezes, increasing to gales at the close of the period, prevailed; as a whole, however, the weather was not more stormy than is usually experienced in the north Atlantic during the month of November.

During the greater part of the month an area of high ba-

rometer appears to have existed near the European coasts and to have spread westward over the Atlantic ocean for a considerable distance, and fine weather, with light to moderate easterly winds prevailed over the region south of the fortieth parallel and from the European coast westward to about 35° W.

The following descriptions refer to the depressions charted:

1.—On the 1st an area of low barometer, at the centre of which the pressure was less than 29.5 (749.3), was to the southward of Newfoundland, causing strong easterly gales along the southern coast of that island, with moderate to strong s. and se. gales between W. 55° and 60°, and moderate northerly winds in Nova Scotia. Some loss of life and much damage to shipping occurred along the Newfoundland coasts during the prevalence of those gales. On the 2d the depression having moved rapidly northeastward, was shown near N. 53° W. 37°, where the lowest pressure reported was 29.53 (750.0); strong winds to moderate gales occurred in all quadrants. The reports indicate that a rapid decrease of pressure occurred during the 2d, and by the 3d the barometer at the storm-centre, near N. 54° W. 27°, was below 29.0 (736.6), and the winds had increased to strong gales. The following reports show the violence of this storm:

Captain G. Cochrane, commanding the s. s. "The Queen," reported: "November 2d, 8 p. m. Greenwich time, lat. 49° 44' N., long. 18° 25' W., barometer 30.05 (763.3), wind backing to southward and rapidly increasing, with gusts; barometer falling; midnight, fresh gale from sse. and backing to se. with confused sea. November 3d, 3 a. m., barometer 29.35 (745.5); wind suddenly shifted in a heavy squall with rain, to ssw., and gradually hauled to wsw.; by 8 a. m. it was blowing a fresh gale with high sea, barometer still falling slowly after the shift of wind. At noon, lat. 49° 28' N., long. 22° 47' W., strong gale with fierce squalls and very heavy wsw. sea; 4 p. m., weather the same, barometer 29.17 (740.9); at 8 p. m. wind w., but no abatement in the fury of the gale and a tremendous sea running; midnight, still blowing furiously with very heavy and dangerous westerly sea running, barometer steady since 4 p. m. At 4 a. m. of November 4th wind hauling to wnw., barometer rising slowly, weather settling into a strong wnw. gale and squally, with heavy wnw. sea running; noon, lat. 49° 12' N., long. 25° 17' W., gale moderating and sea going down."

Captain W. P. Couch, commanding the s. s. "Ontario," between N. 56° 38', W. 24° 32', and N. 55° 55', W. 31° 00', reported: "November 2d, 17 hrs. 40 m., barometer began to fall rapidly, the wind increasing till noon, when it was blowing a strong gale with high sea from e. $\frac{1}{2}$ s., barometer 28.82 (732.0), with rain and dull weather; at 3 hrs. 40 m. of the 3d, wind shifted to s. $\frac{1}{2}$ w., and moderated suddenly; 5 hrs. 40 m., light airs and calms, barometer 28.77 (730.7), until 10 hrs. 44 m., when the breeze sprang up from n. $\frac{1}{2}$ e., increasing to a gale of force 8, with confused sea and rainy weather; at noon barometer rising and wind decreasing to a fresh breeze, barometer 29.66 (753.7)."

Captain Laub, commanding the s. s. "Thingvalla," reported, "November 2d, in N. 54° 15', W. 33° 50' at 8 p. m., (ship's time) barometer 29.25 (742.9) wind ese. force 9, high nw. sea, rain; 9 p. m. 29.16 (740.7) wind ese. 10, high nw. sea, rain; 10 p. m. 29.07 (738.4), wind e. by s. 10, sea going down; 11 p. m. 29.00 (736.6), wind e. 10; midnight, 28.92 (734.6), wind e. by n. 8. November 3d, 1 a. m. barometer 28.86 (733.0), wind e. by n. force 7, confused sea; 4 a. m. 28.69 (728.7), wind ne. by e. force 5, confused sea; 6 a. m. 28.55 (725.2), wind ne. by n. 7, confused sea; 8 a. m. 28.46 (722.9), wind ne. by n. 7, high and long sea-swell from s.; 10 a. m. 28.54 (724.9), wind ene. force 3, same sea-swell; noon, (N. 54° 58', W. 30° 40'), barometer 28.54 (724.9), wind e. force 5; 5 p. m. barometer 28.55 (725.2), wind nne. force 6; 8 p. m. 28.62 (726.9), wind n. force 6; midnight, 28.62 (726.9), wind n. 6. November 4th, 6 a. m. barometer 28.66 (728.0), wind nnw.; noon, 28.71 (729.2), wind nnw, (N. 55° 57' W. 24° 34').

During the 3d, vessels between N. 45° and 55° and from W.

25° eastward to the European coasts, had heavy southerly gales, shifting during the day to westerly; the pressure over the above region ranged from 29.0 (736.6), to 29.8 (756.9). On the 4th, the depression was near the northwest coast of Ireland, the lowest reported barometric reading being 29.23 (742.4).

2.—This was a continuation of the depressions described as numbers i. and ii. under "Areas of low barometer." During the 2d, it passed eastward over the southern part of the Gulf of Saint Lawrence, and thence northeastward over eastern Newfoundland. By the 3d, it had passed to the eastward of the fiftieth meridian, and probably became merged in low area 1, which then occupied the ocean north of the fiftieth parallel.

3.—This was a continuation of the depression described as low area iii. under "Areas of low barometer." During the 6th, it moved northeastward over the Gulf of Saint Lawrence towards the Strait of Belle Isle, and on the 7th, the storm-centre was near N. 53°, W. 47°. The s. s. "Ontario," W. P. Couch, commanding, reported: "6th, 1 hr. 00 m., wind ese. with hail showers, barometer falling from 30.04 (763.0) to 29.01 (736.8) at 11 hrs. 36 m.; the wind veered to sw., blowing strongly, with high confused sea; barometer still falling until 0 hr. 46 m. of the 7th, (near N. 53° 13', W. 49° 00'), when it read 28.52 (724.4); the wind then suddenly shifted to nw. $\frac{1}{2}$ w., and increased to a fresh gale with hail squalls; the barometer then began to rise and the wind moderated." During the 7th, strong w. winds to moderate gales prevailed over the Banks of Newfoundland; on the 8th, the region of least pressure was shown near N. 55°, W. 28°. Between the meridians of 15° and 30° west longitude, and from N. 45° to 52°, the barometric readings ranged from 29.38 (746.2) to 29.73 (755.1), and heavy ssw. to w. gales occurred over that region, several steamers sustaining damage to deck fittings. During the 8th, the depression was apparently forced to the northward beyond the field of observation, and the pressure over the ocean between W. 15° and 25° and south of N. 51°, increased to 30.0 (762.0) while a decrease of pressure had set in over the region west of the thirtieth meridian.

4.—The observations for the 9th showed an extensive area of low barometer, occupying the ocean from the Banks of Newfoundland northeastward to the thirtieth meridian, and over this region the barometric readings ranged from 29.3 (744.3) to 29.7 (754.4), with strong s. to w. breezes or moderate gales. On the 10th the disturbance was central near W. 25° and between N. 50° and 55°; vessels on the fiftieth parallel and southward to N. 45° had strong winds to moderate gales from w. and nw., with barometer ranging from 29.18 (741.2) to 29.65 (753.1); to the eastward of W. 25° the winds were southerly, blowing with the force of a moderate or fresh gale. During the 10th there was an increase of pressure over the region to the eastward of W. 20°; this increase apparently extended westward during the 11th and 12th, and the area of low barometer was forced to the northwestward and beyond the field of observation.

5.—This depression occupied the Gulf of Saint Lawrence and southern Newfoundland on the 12th, with pressure near the centre about 29.6 (751.8). During the 12th the depression moved eastward with decreasing pressure and on the following day it was shown near N. 47°, W. 43°, in which region the barometer ranged from 29.08 (738.6) to 29.3 (744.2); moderate to fresh nw. gales occurred over the Banks of Newfoundland and eastward to W. 43°, while fresh s. gales prevailed to the eastward of that meridian. The s. s. "Aurania," W. H. P. Hains, commanding, reported: "on the 12th at 14 hrs 33 m., in N. 47° 43', W. 39° 32', moderate sse. breeze, barometer 29.82 (757.4); 16 hrs 37 m., barometer 29.61 (752.1); 18 hrs 41 m., rain began to fall, wind increasing, barometer 29.48 (748.8); 20 hrs 45 m. strong wind veering to s. and w., thick, rainy weather, barometer 29.26 (743.2); at 22 hrs 49 m., wind sw., barometer 28.94 (735.1), minimum reading; at 23 hrs 51 m., barometer 29.01 (736.8), wind suddenly flew to nw. and increased rapidly, with high sea; 13th, 00 hrs 53 m., fresh gale, barometer 29.08

(738.6); 2 hrs 55 m., strong nw. gale, barometer 29.18 (741.2), position N. 46° 42', W. 43° 49'; at 4 hrs 59 m., barometer 29.38 (746.2); at 7 hrs 3 m., gale moderating."

The depression extended southward and eastward to N. 44°, W. 35°, vessels in that neighborhood having encountered strong s. gales with pressure about 29.5 (749.3). By the 14th the area of low barometer was transferred to about N. 54°, W. 30°, the lowest reported reading being 29.28 (743.7); an area of high barometer occupied the region east of the thirtieth meridian, and during the 14th the depression probably filled in.

6.—This depression appeared off the eastern coast of Newfoundland on the 15th, the pressure having decreased about .6 inch since the observations of the 14th. Moderate w. gales occurred over the region between W. 60° and 45°, and from N. 42° to 48°; while strong s. and sse. gales prevailed from N. 50°, W. 45° southeastward to N. 40°, W. 38°. During the 15th the depression moved in a course slightly to the south of east, and on the 16th it was shown as an extensive disturbance central near N. 48°, W. 39°, its centre, where the pressure was less than 29.1 (739.1), being indicated clearly by the well-defined cyclonic movement of the winds in that region. This disturbance was felt as far south as the fortieth parallel; the ship "E. J. Spicer," D. Spicer, commanding, in N. 43° 26', W. 37° 58', had a wsw. gale of force 8, with thunder and heavy rain, barometer 29.31 (744.5); and the ship "Ariel," F. Schwings, commanding, in N. 39° 57', W. 38° 32', had a gale from sw., veering to w. and nw., and increasing to almost hurricane force, with heavy rain; lowest barometer 29.26 (743.2). By the 17th the pressure had increased to 29.8 (756.9) over the region between N. 40° and 50° and W. 30° and 40°, while an area of high barometer began to spread westward over the ocean north of the forty-fifth parallel.

7.—This depression appeared near the Carolina coast on the 16th, and displayed considerable energy during its passage northeastward. On the 16th it was central near N. 33°, W. 73°, the lowest reported barometer reading being 29.29 (744.0); it began with a southeast gale of force 7, and increased in force as the wind shifted to w. and nw., until it reached hurricane force, and continued for several hours. As it approached the coast it caused heavy rains at Hatteras and other stations on the Carolina coast.

The following vessels encountered the storm: s. s. "State of Texas," off Cape Hatteras, reported "sudden cyclone, wind blowing with extreme violence for twelve hours; heavy rain-fall." Off Hatteras, schooner "Nelly," cyclone lasting eighteen hours; lost and split sails, had decks swept and sustained other damages; brig "Daisy Boynton," in N. 34° 40', W. 74° 00', had hurricane from wsw.; decks swept, lost sails and spars and sprung a leak; bark "B. F. Watson," in N. 34° 30', W. 72° 30', short, severe gale from wsw. to nw.; schooner "Isle of June," in N. 34° 30', W. 75° 00', nw. gale lasting twenty-four hours; schooner "Viola Reppard," L. Ogier, commanding, reported in N. 33° 14', W. 72° 00', barometer 29.7 (754.4) wind se., force 8.

Captain J. C. Wiltbank, commanding the schooner "Geo. W. Lochner," reported as follows: "15th, (about N. 33° 55', W. 75° 41') 8 p. m., barometer 29.94 (760.5), strong ene. gale; midnight, wind n., heavy; 4 a. m. of the 16th, wind shifted to se., barometer 29.64 (752.8); 6 a. m., wind shifted to nne. with hurricane force and very high cross sea, barometer 29.54 (750.3); kept ship before the gale; 8 a. m., very heavy rain, wind nnw. with terrific squalls; 11 a. m., barometer 29.34 (745.2); 12 m., winds from w. to nw., barometer 29.29 (744.0); 4 p. m., squalls moderating, barometer rising slowly; midnight, gale breaking, weather still squally with very high sea, barometer 29.59 (751.6)."

The depression moved northeastward along the coast and on the 17th it was central near N. 39°, W. 70°, causing strong ne. to nw. gales off the middle Atlantic and New England coasts. On the 18th the depression was central near N. 44°, W. 56°, having been joined, off the coast of Nova Scotia, by

the depression described as number vi. under "Areas of low barometer." Near the centre of the combined depressions the pressure was about 29.5 (749.3). During the 19th and 20th the depression moved eastward, attended by increasing pressure and strong breezes to moderate gales; by the last-mentioned date it had apparently filled in and an area of barometric maxima occupied the ocean from the Banks of Newfoundland eastward to the European coasts.

8.—This was a continuation of the depression described as number viii. of "Areas of low barometer." On the 21st it was central south of Newfoundland, the pressure ranging from 29.6 (751.8) to 29.75 (755.6); the disturbance moved northeastward, and during the 22d, 23d, and 24th it occupied the region between N. 50° and 55° and W. 40° and 35°, while an area of high barometer prevailed over the ocean to the eastward of the last-mentioned meridian; moderate w. gales prevailed on the fiftieth parallel during the above dates, and by the 25th the depression had disappeared from the chart.

9.—This was a continuation of low area ix. of "Areas of low barometer." It passed over the Gulf of Saint Lawrence during the 24th, and on the following day it was to the northeastward of Newfoundland, where it probably filled in. By the 26th the area of barometric maxima, within which the barometer ranged from 30.15 (765.8) to 30.55 (776.0), covered the Atlantic from W. 50° eastward to W. 10°.

OCEAN ICE.

The positions of the icebergs observed during November, 1884, are shown on chart i. by the shaded spots.

The following reports were received:

October 30th.—S. S. "Persian Monarch," in N. 46° 29', W. 53° 24', passed two icebergs.

November 17th.—S. S. "Lord Clive," in N. 45° 56', W. 53° 38', passed a number of icebergs.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for the month of November, 1884, is exhibited on chart ii. by the dotted isothermal lines. In the table below are shown the mean temperatures for November, 1884, with the November normals and the departures in the several geographical districts, as deduced from the Signal Service observations.

Average temperatures for November, 1884.

Districts.	Average for Nov. Signal-Service observations.		Comparison of Nov. 1884, with the average for several years.
	For several years.	For 1884.	
New England	40.1	40.7	+0.6
Middle Atlantic states	45.8	46.4	+0.6
South Atlantic states	55.2	55.1	-0.1
Florida peninsula	67.1	66.8	-0.3
Eastern Gulf states	55.9	54.5	-1.4
Western Gulf states	56.3	56.0	-0.3
Rio Grande valley	64.4	65.0	+0.6
Tennessee	48.4	48.6	+0.2
Ohio valley	43.3	44.3	+1.0
Lower lake region	37.8	37.5	-0.3
Upper lake region	23.0	33.6	+10.6
Extreme northwest	23.9	27.0	+3.1
Upper Mississippi valley	38.3	40.1	+1.8
Missouri valley	33.1	35.0	+1.9
Northern slope	29.7	37.1	+7.4
Middle slope	37.0	40.9	+3.9
Southern slope	50.6	51.5	+0.9
Southern plateau	49.2	53.2	+4.0
Northern plateau	49.1	52.6	+3.5
North Pacific coast region	43.9	47.0	+3.1
Middle Pacific coast region	52.8	55.5	+2.7
South Pacific coast region	58.7	60.4	+1.7
Mount Washington, N. H.	16.8	16.8	Normal
Pike's Peak, Colo.	8.1	13.3	+5.2
Salt Lake City, Utah	38.4	42.1	+3.7

On chart iv. the departures are graphically exhibited by lines connecting stations where the departures coincide. From this chart it will be seen that the month of November has been

warmer than the average over nearly the whole country. In the Gulf states, (except along the coast of Texas, south of Indianola) and in southern Florida, the month has been colder than the average; the mean temperature has also been below the normal in southeastern Tennessee and over portions of Virginia, West Virginia, Kentucky, Ohio, and from the upper lakes eastward to the Saint Lawrence valley; slight deficiencies in the mean temperature are also shown over northern New Jersey, northeastern Pennsylvania and the western portions of Connecticut and Massachusetts. The stations reporting the greatest departures below the normal temperatures are as follows: Mobile, Alabama, 3° 0; New York City, 2° 5; Pensacola, Florida, 2° 2; Alpena, Michigan, 2° 1. Along the New England coast, from southern New Jersey to northern Georgia, and over the western districts the mean temperatures have been above the normal, the departures exceeding 5° over portions of Arizona, New Mexico, Colorado and Utah, while in Montana they vary from 5° to 11°. In the table of miscellaneous meteorological data will be found the departures from the normal for the several stations of the Signal Service.

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average temperatures for November, 1884; in the table of miscellaneous meteorological data, and on chart iv. The following notes in connection with this subject are reported by voluntary observers:

Arkansas.—Lead Hill, Boone county: mean temperature, 47° 4, is 0° 4 below the November average for the last three years.

Illinois.—Anna, Union county: mean temperature, 47° 4, is 2° 0 above the November average for the last nine years.

Riley, McHenry county: mean temperature, 32° 8, is 0° 3 below the November average for the last twenty-four years. The mean daily temperature from 1st to 22d, averaged 38° 0; and from 22d to 30th, it averaged 18° 4. The first half of the month was warmer than any corresponding period during the last twenty-four years. The mean temperature for the autumn of 1884, is 49° 8, or 3° 1 higher than the mean for the last twenty-three years; only the autumns of 1865, 1867, 1870, and 1882, were warmer, and up to November 22d, 1884, the autumn was the warmest for the above period, but the low temperatures after that date materially reduced the mean for the season.

Mattoon, Coles county: mean temperature, 42° 0, is about 3° above the November average for the last four years.

Sycamore, DeKalb county: mean temperature, 32° 8, is 5° 2 below the November average for the last three years.

Indiana.—Vevay, Switzerland county: mean temperature, 45° 1, is 1° 4 above the November average for the last nine years.

Wabash, Wabash county: mean temperature, 38° 1, is 4° 6 above the November average for the last nine years.

Kansas.—Independence, Montgomery county: mean temperature, 45° 6, is 2° 0 above the November average for the last thirteen years.

Lawrence, Douglas county: mean temperature, 41° 5, is 2° 1 above the November average for the last seventeen years.

Yates Centre, Woodson county: mean temperature, 39° 5, is 2° 3 above the November average for the last four years. The mean temperature for the autumn of 1884, exceeds by 6° 2, the autumn average for the last four years.

Emporia, Lyon county: mean temperature, 43° 3, is 3° 4 above the November average for the last five years.

Maine.—Gardiner, Kennebec county: mean temperature, 36° 0, is 0° 4 above the November average for the last forty-eight years.

Maryland.—Fallston, Harford county: mean temperature, 42° 9, is 0° 8 above the November average for the last fourteen years; the highest November mean for that period, 46° 7, occurred in 1870; the lowest, 38° 5, occurred in 1880.